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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,565	09/12/2003	Howard Rhodes	M4065.0570/P570-A	5308
24998	7590	10/24/2006		
DICKSTEIN SHAPIRO LLP 1825 EYE STREET NW Washington, DC 20006-5403			EXAMINER ARENA, ANDREW OWENS	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 10/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	10/660,565	RHODES ET AL.	
	Examiner	Art Unit	
	Andrew O. Arena	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 90 and 93-141 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 90,93-121 and 130-136 is/are allowed.
- 6) ☒ Claim(s) 122-129 and 137-141 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

Claims 122-129 are rejected under 35 U.S.C. 102(b) as being anticipated by Rhodes (US 6,204,524).

Re claim 122, Rhodes discloses (Fig 6-14) a method of forming an imager (col 8 ln 28-30) comprising the steps of:

providing a semiconductor substrate (116+120; col 8 ln 30-32) having a doped layer (120) of a first conductivity type (col 8 ln 32-33);

forming a field oxide region (115; col 7 ln 25-28) in said semiconductor substrate;

forming a photosensor (Fig 5: 125; col 7 ln 36-37; formed: col 8 ln 45 – col 9 ln 25) including a charge collection region (110) of a second conductivity type (col 7 ln 31-32), said charge collection region being provided in said doped layer (col 7 ln 30-31);

forming a floating (not connected to a fixed potential) diffusion region (155) for receiving charge from said charge collection region (col 7 ln 61-64), said floating diffusion region being (indirectly) connected to a gate of a pixel output transistor (136);
and

forming a charge storage capacitor (162; col 9 ln 36-37) over said semiconductor substrate (col 7 ln 66-67) so that one electrode (156) of said storage capacitor is connected directly to said floating diffusion region by an electrical contact (150; col 8 ln 10-13).

Re claim 123, Rhodes discloses (Fig 5) the entire extent of said charge storage capacitor overlies said field oxide region (no portion of 162 lies under 115).

Re claim 124, Rhodes discloses (Fig 5) the entire extent of said charge storage capacitor overlies an active area of said photosensor (no portion of 162 lies under 125).

Re claim 125, Rhodes discloses (Fig 5) said charge storage capacitor is formed partially (col 8 ln 20-21) over said field oxide region (left side of 162) and partially over an active area of said photosensor (right side of 162).

Re claim 126, Rhodes discloses (Fig 14) the other electrode (160) of said charge storage capacitor is connected to ground (col 10 ln 25-28).

Re claim 127, Rhodes discloses (Fig 5) the other electrode of said charge storage capacitor is connected to a gate of a transistor (there exists a connection pathway from 160 to 108 of 128).

Re claim 128, Rhodes discloses (Fig 14) said transistor (ex, 128) is part of a three-transistor cell (ex. 102, 128, 132).

Re claim 129, Rhodes discloses (Fig 5) said transistor (ex, 128) is part of a four-transistor cell (ex. 102, 128, 132, 136).

Claim Rejections - 35 USC § 103

Claims 137-141 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rhodes in view of Lauxtermann (US 2001/0015831).

Re claim 137, Rhodes discloses (Fig 6-14) a method of forming an imager (col 8 ln 28-30) comprising the steps of:

Art Unit: 2811

providing a semiconductor substrate (116+120; col 8 ln 30-32) having a doped layer (120) of a first conductivity type (col 8 ln 32-33);

forming a field oxide region (115; col 7 ln 25-28) in said semiconductor substrate;

forming a photosensor (Fig 5: 125; col 7 ln 36-37; formed: col 8 ln 45 – col 9 ln 25) including a charge collection region (110) of a second conductivity type (col 7 ln 31-32), said charge collection region being provided in said doped layer (col 7 ln 30-31);

forming a floating diffusion region (130; col 7 ln 41-43) for receiving charge from said charge collection region (col 7 ln 61-64); and

connecting an electrode (156) of a {second} charge storage capacitor (Fig 5: 162; col 9 ln 36-37) to said charge collection region (110) by a {second} electrical contact (150; col 7 ln 61-64).

Rhodes differs from the claimed invention only in not disclosing “connecting an electrode of a first charge storage capacitor to said floating diffusion region.”

Lauxtermann discloses (Fig 2B) an analogous CMOS imager (¶1) comprising a photosensor (PD; ¶6 ln 5) and a region (55; ¶7 ln 5-7) for receiving charge from said photosensor (¶6 ln 7-11) and teaches (Fig 2B) connecting an electrode of a charge storage capacitor (C1) to the region (55).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Rhodes in view of Lauxtermann by connecting an electrode of a first charge storage capacitor to said floating diffusion region by a first electrical contact (first capacitor will differ from {second} only in being formed above and

Art Unit: 2811

connected to 130 instead of 155); at least to separate the detection and reading processes (Lauxtermann [0006] ln 17-19).

Re claim 138, Rhodes discloses (Fig 5) said first charge storage capacitor is formed such that the extent of said charge storage capacitor overlies said field oxide region (no portion of 162 lies under 115).

Re claim 139, Rhodes discloses (Fig 5) a first portion (left side of 162) of said first charge storage capacitor is formed over said field oxide region, and a second portion (right side of 162) of said first charge storage capacitor is formed over an active area of said photosensor (col 8 ln 20-21).

Re claim 140, Rhodes discloses (Fig 5) said second charge storage capacitor is formed such that the extent of said charge storage capacitor overlies said field oxide region (no portion of 162 lies under 115).

Re claim 141, Rhodes discloses (Fig 5) a first portion (left side of 162) of said second charge storage capacitor is formed over said field oxide region, and a second portion (right side of 162) of said second charge storage capacitor is formed over an active area of said photosensor (col 8 ln 20-21).

Response to Arguments

Applicant's arguments filed 08/16/2006 with respect to claims 122-129 have been fully considered but they are not persuasive.

Applicant alleges that Rhodes fails to disclose all limitations of claims 122-129. Examiner does not concur.

Applicant's argument that "In Rhodes, storage capacitor 162...is connected to...region 155 and not to the floating diffusion region 130" is not germane to the rejection applied by the examiner since 130 has not been relied upon.

Applicant's argument that region 155 of Rhodes is not a "floating diffusion region...connected to a gate of a pixel output transistor" is not persuasive. A connection exists between 155 and the gate of 136; applicant has presented neither claim language nor evidence to distinguish the claimed "floating diffusion region" from region 155 of Rhodes.

Applicant's argument that "no electrode of the storage capacitor 162 of Rhodes is connected directly to a floating diffusion region by an electrical contact" is not persuasive. Rhodes discloses (Fig 5) that electrode 150 of the charge storage capacitor 162 is connected directly (col 8 ln 10-13) to the floating diffusion region 155 by electrical contact 150.

Examiner submits that Rhodes anticipates the subject matter of claims 122-129.

Applicant's arguments filed 08/16/2006 with respect to claims 137-141 have been fully considered but they are not persuasive.

In response to applicant's arguments against the references individually ("Rhodes is silent about a first charge storage capacitor and a second charge storage capacitor"; "Lauxtermann relates to a method of maintaining constant the sampled charge stored in memory node..."), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Rhodes differs from the claimed invention only in not disclosing a capacitor connected to the claimed floating diffusion region. Lauxtermann discloses a device nearly identical to that of Rhodes, including a capacitor connected to the claimed floating diffusion region. Lauxtermann suggests the desirability of said claim limitation. See MPEP § 2143.01.

Examiner has met all three basic requirements of a *prima facie* case of obviousness. See MPEP § 2143. Applicant has not provided persuasive evidence of nonobviousness. See MPEP §2142 (¶1).

Examiner submits that applicant's arguments have not overcome the established *prima facie* case of obviousness of claims 137-141.

As a formal note, applicant's title submitted 08/16/2006 is not descriptive of the presently allowed claims, however, the title proposed by the examiner in the action dated 07/07/2006 is. If the rejected claims are amended to be allowable for the same reasons as those presently allowed, the title should be amended accordingly.

Allowable Subject Matter

Claims 90, 93-121 and 130-136 are allowed.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

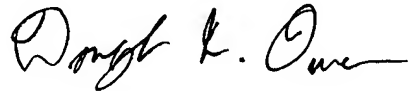
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew O. Arena whose telephone number is 571-272-5976. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard T. Elms can be reached on 571- 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2811

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Andrew O Arena
19 October 2006

 10/23/06
DOUGLAS W. OWENS
PRIMARY EXAMINER